

# PH1214-300M



Radar Pulsed Power Transistor  
300W, 1.2-1.4 GHz, 150µs Pulse, 10% Duty

M/A-COM Products  
Released, 30 May 07

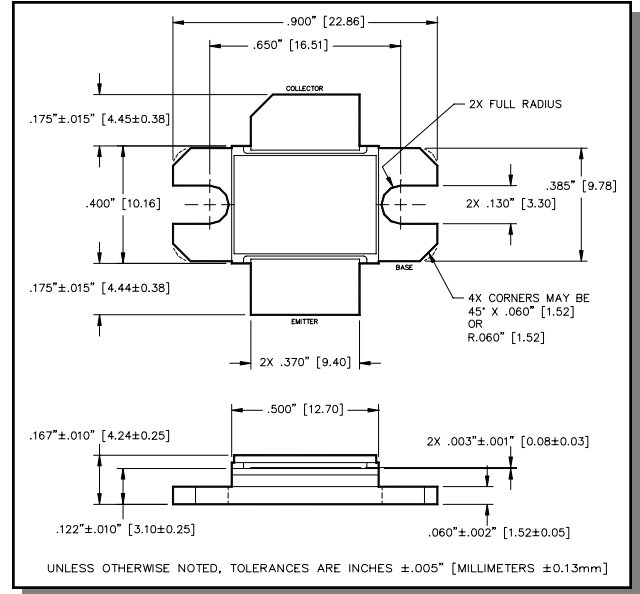
## Features

- NPN silicon microwave power transistors
- Common base configuration
- Broadband Class C operation
- High efficiency inter-digitized geometry
- Diffused emitter ballasting resistors
- Gold metallization system
- Internal input and output impedance matching
- Hermetic metal/ceramic package
- RoHS compliant

## Absolute Maximum Ratings at 25°C

Parameter	Symbol	Rating	Units
Collector-Emitter Voltage	$V_{CES}$	90	V
Emitter-Base Voltage	$V_{EBO}$	3.0	V
Collector Current (Peak)	$I_C$	21.0	A
Power Dissipation @ +25 °C	$P_{TOT}$	583	W
Storage Temperature	$T_{STG}$	-65 to +200	°C
Junction Temperature	$T_j$	200	°C

## Outline Drawing



## Electrical Specifications: $T_C = 25 \pm 5^\circ\text{C}$ (Room Ambient)

Parameter	Test Conditions	Frequency	Symbol	Min	Max	Units
Collector-Emitter Breakdown Voltage	$I_C = 80\text{mA}$		$BV_{CES}$	90	-	V
Collector-Emitter Leakage Current	$V_{CE} = 40\text{V}$		$I_{CES}$	-	10	mA
Thermal Resistance	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	$R_{TH(JC)}$	-	0.30	°C/W
Output Power	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	$P_{OUT}$	300	-	W
Power Gain	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	$G_P$	8.75	-	dB
Collector Efficiency	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	$\eta_C$	50	-	%
Input Return Loss	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	RL	-	-10	dB
Pulse Droop	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	Droop	-	1.0	dB
Load Mismatch Tolerance	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	VSWR-T	-	2:1	-
Load Mismatch Stability	$V_{CC} = 40\text{V}$ , $P_{in} = 40\text{W}$	$F = 1.2, 1.3, 1.4 \text{ GHz}$	VSWR-S	-	1.5:1	-

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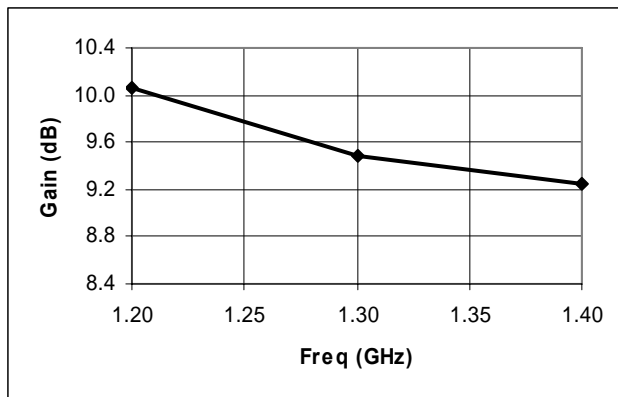
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## Typical RF Performance

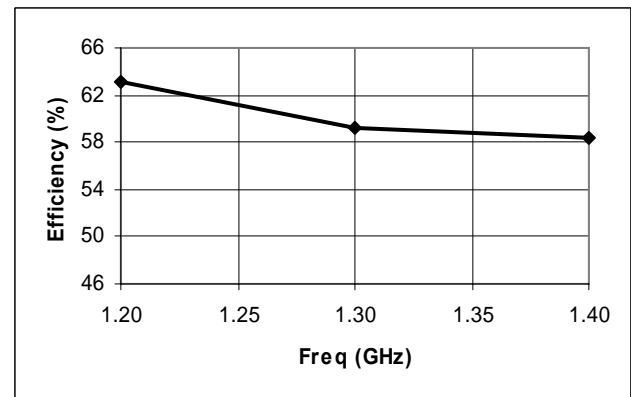
Freq. (GHz)	Pin (W)	Pout (W)	Gain (dB)	ΔGain (dB)	Ic (A)	Eff. (%)	Droop (dB)	RL (dB)	P1dB Overdrive					VSWR-S		
									Pout (W)	ΔPout (dB)	Gain (dB)	Droop (dB)	Eff. (%)	1.5:1	2:1	2.5:1
1.2	40	406	10.06	0.82	16.1	63.2	0.10	-18	451	0.46	9.52	0.38	59.8	S	S	S
1.3	40	355	9.48		15.0	59.3	0.04	-15	412	0.65	9.12	0.32	58.2	S	S	S
1.4	40	336	9.24		14.4	58.4	0.06	-16	378	0.51	8.75	0.35	56.0	S	S	S

Note: ΔPo(dB) is the difference between Pout at 1dB overdrive and Pout at Pin = 40W.

## Gain vs. Frequency



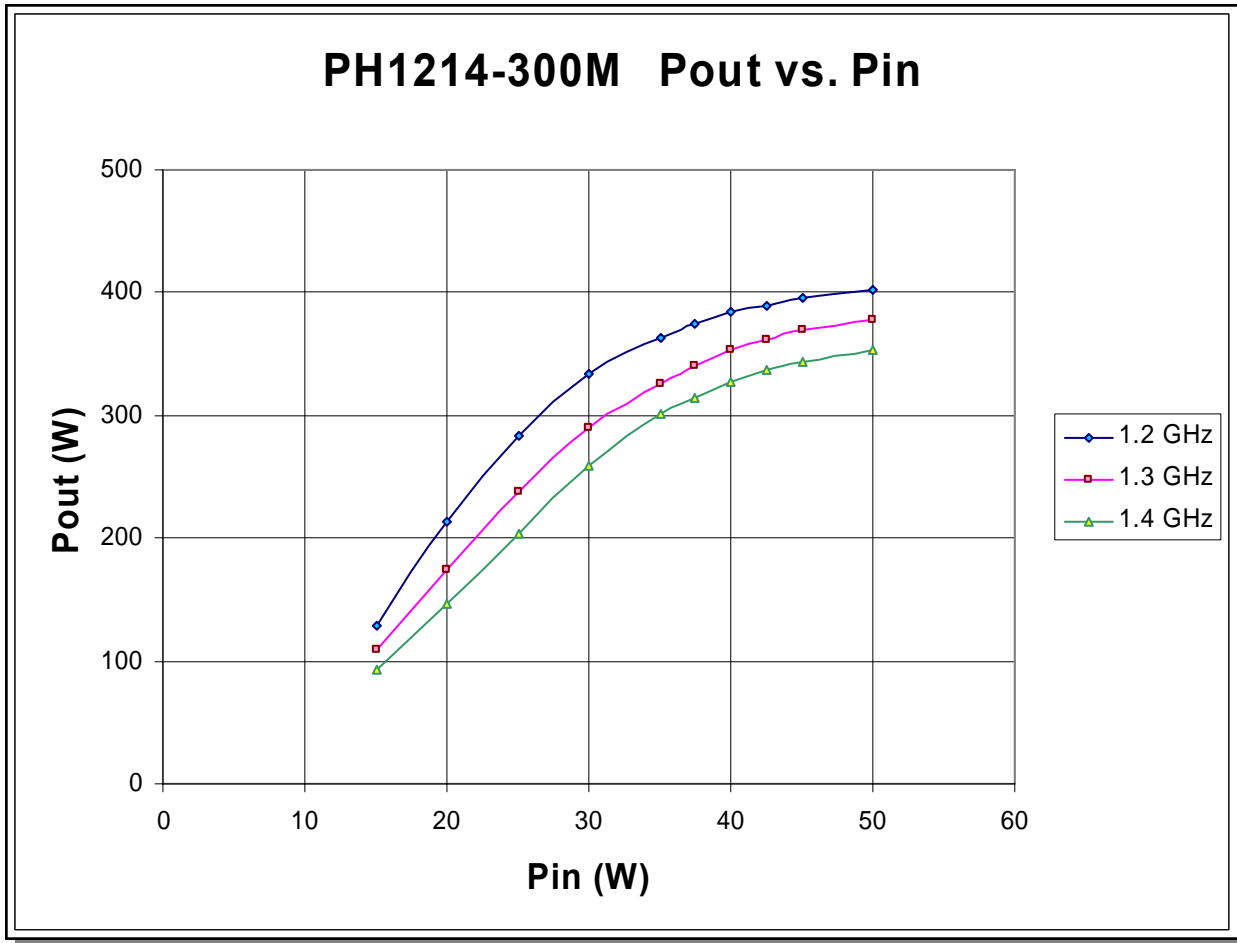
## Collector Efficiency vs. Frequency



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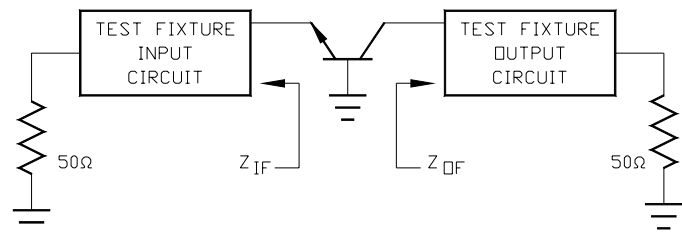
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## RF Power Transfer Curve (Output Power Vs. Input Power)



### Broadband Test Fixture Impedance

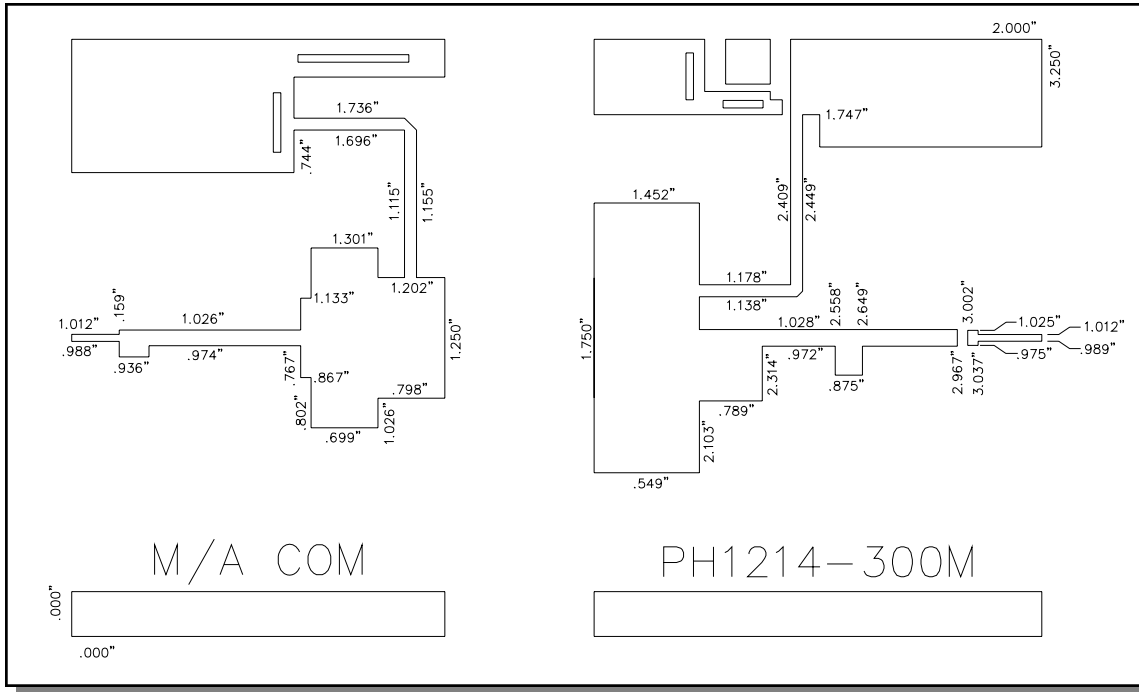
F (GHz)	Z <sub>IF</sub> (Ω)	Z <sub>OF</sub> (Ω)
1.2	1.9 - j2.3	1.3 - j1.6
1.3	1.9 - j1.7	1.2 - j1.2
1.4	1.8 - j1.4	1.0 - j0.9



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## Test Fixture Circuit Dimensions



## Test Fixture Assembly

